

BAB VIII

PERHITUNGAN PONDASI TELAPAK P3

8.1 Beban yang Bekerja (ETABS)

$$P_u := 18823.79 \text{ kg}$$

8.2 Kontrol dimensi pondasi

Dimensi pondasi

$$B := 120 \text{ cm} \quad L := 120 \text{ cm}$$

$$A := B \cdot L = 14400 \text{ cm}^2$$

$$W_x := \frac{B \cdot L^2}{6} = 288000 \text{ cm}^3$$

$$W_y := \frac{L \cdot B^2}{6} = 288000 \text{ cm}^3$$

Tegangan yang terjadi

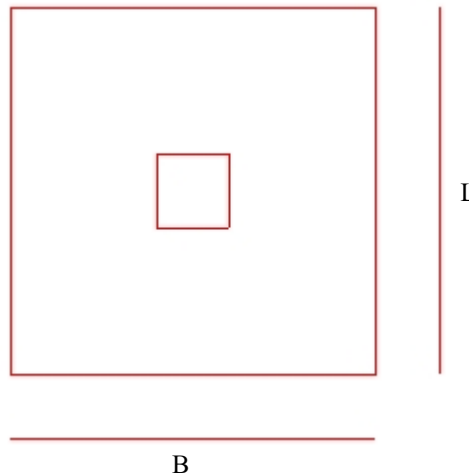
$$\sigma_{\max} := \frac{P_u}{A} = 1.307 \text{ kg/cm}^2$$

Tegangan ijin tanah (data sondir kedalaman 1.5 m)

$$q_c := 5.18 \text{ kg/cm}^2$$

$$SF := 3$$

$$q_{ijin} := \frac{q_c}{SF} = 1.727 \text{ kg/cm}^2 > \sigma_{\max} = 1.307 \text{ kg/cm}^2 \quad \text{OK!!}$$



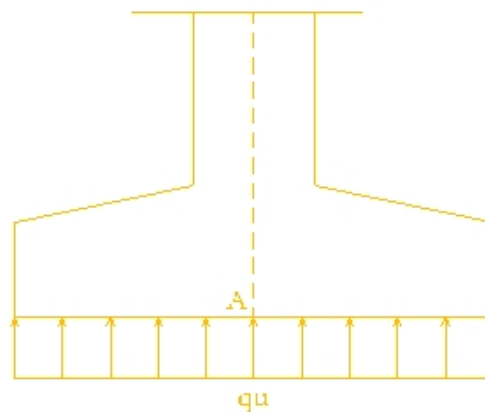
8.3 Penulangan Pondasi telapak

Momen pada pondasi (momen pada POT. A) :

$$q_u := \sigma_{\max} \cdot 1000 = 1307.208 \text{ kg/m}$$

$$M_p := \frac{q_u \cdot 0.8^2}{2} = 418.306 \text{ kgm}$$

$$M_{ult} := 1.2 \cdot M_p = 501.968 \text{ kgm}$$



Adapun data - data perencanaan untuk penulangan pondasi :

- Tebal pelat : $h := 250 \text{ mm}$
- Tebal decking $s := 50 \text{ mm}$
- Diameter tulangan rencana $\phi 12$

- Mutu tulangan baja $f_y := 390 \text{ Mpa}$
- Mutu beton $f_c := 18.675 \text{ Mpa}$

$$d_{\text{aksen}} := 70 + 6 = 76 \text{ mm}$$

$$d := h - d_{\text{aksen}} = 174 \text{ mm}$$

$$b := 1200 \text{ mm}$$

$$\beta := 0.85$$

Berdasarkan SNI 2847 pasal 10.4.3 :

$$\rho_{\text{balance}} := \frac{0.85 \cdot \beta \cdot f_c \cdot \left(\frac{600}{600 + f_y} \right)}{f_y} = 0.021$$

$$\rho_{\text{max}} := 0.75 \cdot \rho_{\text{balance}} = 0.016$$

Berdasarkan SNI 03-2847-2002 pasal 9.12.2

$$\rho_{\text{min}} := \frac{1.4}{f_y} = 0.0036$$

$$m := \frac{f_y}{0.85 \cdot f_c} = 24.569$$

$$M_n := \frac{\text{Mult} \cdot 9.81 \cdot 1000}{0.8} = 6155379.33 \text{ Nmm}$$

$$R_n := \frac{M_n}{b \cdot d^2} = 0.169 \text{ N/mm}^2$$

$$\rho := \frac{\left(1 - \sqrt{1 - \frac{2m \cdot R_n}{f_y}} \right)}{m} = 0.00044$$

$$\rho = 0.00044 < \rho_{\text{min}} = 0.0036$$

$$A_{\text{perlu}} := \rho_{\text{min}} \cdot b \cdot d = 749.54 \text{ mm}^2$$

jadi pasang tulangan lentur $\phi 12-150$

$$A_{\text{spg}} := 8 \cdot 0.785 \cdot 12^2 = 904.32 \text{ mm}^2$$

8.4 Kontrol geser pons

- Beban Aksial Kolom

Perencanaan penampang akibat geser didasarkan pada beban aksial kolom

$$N_{uk} := 184.653 \text{ kN}$$

- Dengan persyaratan $V_u < V_c$ (gaya geser ultimate harus lebih kecil dari kuat geser nominalnya).

$$\text{tebal pondasi } t_p := 25 \text{ cm}$$

$$\text{dimensi kolom } 15/40 \text{ cm}$$

$$b_o := 0.5 \cdot t_p + 15 + 0.5 \cdot t_p = 40 \text{ cm}$$

$$d_o := 0.5 \cdot t_p + 40 + 0.5 \cdot t_p = 65 \text{ cm}$$

- Keliling Kritis

$$U := 2 \cdot (b_o + d_o) = 210 \text{ cm}$$

- Luas Kritis

$$A_k := U \cdot t_p = 5250 \text{ cm}^2$$

- Kekutan Geser Beton

$$\beta_c := \frac{15}{40} = 0.375$$

$$d := t_p - 7 - 1.2 = 16.8 \text{ cm}$$

$$V_c := \frac{\sqrt{f_c} \cdot U \cdot d \cdot 100 \cdot \left(1 + \frac{\beta_c}{2}\right)}{6 \cdot 10^3} = 301.746 \text{ kN} \quad \text{..... SNI 2847 pasal 13.12.2.1}$$

Syarat $V_u \leq \phi V_c$

$$\phi := 0.75$$

$$N_{uk} = 184.653 \text{ kN} \quad \blacksquare < \blacksquare \quad \phi \cdot V_c = 226.309 \text{ kN} \quad \text{.....OK!!!}$$

